WHAT IS CLAIMED IS:

1. A ferroelectric thin film element comprising a substrate and an epitaxial ferroelectric thin film provided on said substrate:

wherein said epitaxial ferroelectric thin film satisfies a relation $z/z_0 > 1.003$ wherein a crystal face parallel to a crystal face of a surface of the substrate among crystal faces of said epitaxial ferroelectric thin film is taken as a Z crystal face, a face spacing of said Z crystal face is taken as z and a space of the Z crystal face of a material constituting said epitaxial ferroelectric thin film in a bulk state is taken as z_0, and also satisfies a relation $0.997 \leq x/x_0 \leq 1.003$ wherein one of crystal faces of said epitaxial ferroelectric thin film perpendicular to the Z crystal face is taken as an X crystal face, a face spacing of the X crystal face is taken as x and a face spacing of the X crystal face of the material constituting said epitaxial ferroelectric thin film in a bulk state is taken as x_0.

2. A ferroelectric thin film element according to claim 1, wherein said epitaxial ferroelectric thin film has a thickness within a range of 2 to 100 nm.

3. A ferroelectric thin film element according

to claim 1, further comprising at least a buffer layer between said substrate and said epitaxial ferroelectric thin film.

4. A ferroelectric thin film element according to claim 3, wherein at least one of said substrate and said buffer layer is electroconductive.

5. A ferroelectric thin film element according to claim 1, wherein said epitaxial ferroelectric thin film has a crystal orientation degree of the Z crystal face, measured by a $2\theta/\theta$ method with an X-ray incident angle θ to the Z crystal face, is 90 % or higher.

6. A ferroelectric thin film element according to claim 1, wherein said Z crystal face has a crystal orientation degree of 99 % or higher.

7. A ferroelectric thin film element according to claim 1, wherein said epitaxial ferroelectric thin film has a perovskite structure.

8. A ferroelectric thin film element according to claim 1, wherein said epitaxial ferroelectric thin film includes a lead (Pb) atom or an oxygen (O) atom as a constituent atom.

9. A ferroelectric thin film element according to claim 1, wherein said epitaxial ferroelectric thin film has a tetragonal crystal structure and the Z crystal face is a (001) face.

10. A ferroelectric thin film element according to claim 1, wherein said epitaxial ferroelectric thin film has a rhombohedral crystal structure and the Z crystal face is a (111) face.

11. A ferroelectric thin film element according to claim 1, wherein said epitaxial ferroelectric thin film has a hexagonal crystal structure and the Z crystal face is a (0001) face.

12. A ferroelectric thin film element according to claim 1, wherein said epitaxial ferroelectric thin film has a rhombic crystal structure and the Z crystal face is a (011) face.

13. A piezoelectric actuator comprising a substrate and an epitaxial ferroelectric film provided on said substrate:

wherein said epitaxial ferroelectric film satisfies a relation $z/z_0 > 1.003$ wherein a crystal face parallel to a crystal face of a surface of the substrate among crystal faces of said epitaxial

ferroelectric film is taken as a Z crystal face, a face spacing of said Z crystal face is taken as z and a space of the Z crystal face of a material constituting said epitaxial ferroelectric film in a bulk state is taken as z_0, and also satisfies a relation $0.997 \leq x/x_0 \leq 1.003$ wherein one of crystal faces of said epitaxial ferroelectric film perpendicular to the Z crystal face is taken as an X crystal face, a face spacing of the X crystal face is taken as x and a face spacing of the X crystal face of the material constituting said epitaxial ferroelectric film in a bulk state is taken as x_0.

14. A piezoelectric actuator according to claim 13, wherein said epitaxial ferroelectric thin film has a thickness within a range of 100 nm to 10 μm.

15. A piezoelectric actuator according to claim 13, further comprising at least a buffer layer between said substrate and said epitaxial ferroelectric film.

16. A piezoelectric actuator according to claim 15, wherein at least one of said substrate and said buffer layer is electroconductive.

17. A piezoelectric actuator according to claim

13, wherein said epitaxial ferroelectric film has a crystal orientation degree of the Z crystal face, measured by a $2\theta/\theta$ method with an X-ray incident angle θ to the Z crystal face, is 90 % or higher.

18. A piezoelectric actuator according to claim 13, wherein said Z crystal face has a crystal orientation degree of 99 % or higher.

19. A piezoelectric actuator according to claim 13, wherein said epitaxial ferroelectric film has a perovskite structure.

20. A piezoelectric actuator according to claim 13, wherein said epitaxial ferroelectric film includes a lead (Pb) atom or an oxygen (O) atom as a constituent atom.

21. A piezoelectric actuator according to claim 13, wherein said epitaxial ferroelectric film has a tetragonal crystal structure and the Z crystal face is a (001) face.

22. A piezoelectric actuator according to claim 13, wherein said epitaxial ferroelectric film has a rhombohedral crystal structure and the Z crystal face is a (111) face.

23. A piezoelectric actuator according to claim 13, wherein said epitaxial ferroelectric film has a hexagonal crystal structure and the Z crystal face is a (0001) face.

24. A piezoelectric actuator according to claim 13, wherein said epitaxial ferroelectric film has a rhombic crystal structure and the Z crystal face is a (011) face.

25. A liquid discharge head for discharging a liquid utilizing a piezoelectric actuator according to claim 13.